~~Torres~~
~~Mitchell~~
~~Carolin~~
~~Cotter~~ Ike
Sartwell

342.6
BMNR 342.6
1418

The Record 5200

Stanley W. Meso March 24, 1966

Forest Insect Control (White Grub Pilot Control Test in Mixed Conifer Plantation)

Background:

White grubs, larvae of June beetles, have a well-substantiated reputation for causing severe damage to roots of seedlings in nursery beds and young trees in plantations. Large numbers of species are scattered throughout this Country. The family of beetles is divided in two groups by feeding habit. The scavenger members are not considered phytophagous while adults and larvae of the leaf chafers are both destructive to plants. Adults confine their feeding to leaves while larvae consume living roots as well as decayed herbacious material.

June beetles are considered to be the most common member of the Scarabaeidae family found associated with forests. Five genera, Diplotaxis, Phyllophaga, Polyphylla, Ochrosidia and Serica, are of economic importance in the East. No intensive studies have been made in Oregon to determine existence, extent or destructiveness of these five genera.

During a preliminary survival check of a tree planting at the Peavine Burn, Rogue River National Forest, in 1965 recently dead seedlings were investigated to determine cause of mortality. Dead seedlings were found almost rootless. Lateral roots and taproot epidermis were found totally destroyed or heavily damaged. Gophers were blamed for this destruction until a more intensive search found no burrows associated with the dead seedlings.

This problem area was examined during the middle of November 1965. Three live June beetle larvae were uncovered. Because of the late date, the three larvae do not accurately represent the infestation intensity. One larva was identified as belonging to the genus Diplotaxis and the remaining two were Polyphylla. These determinations were made by Dr. P. O. Ritcher at Oregon State University.

F. P. Keen described the three-year life cycle of Polyphylla. First-year larvae feed on organic matter or small roots near the soil surface and burrow deep to hibernate when fall temperatures begin to drop. Second-season larvae do the greatest damage to roots because of increasing food requirements. Larvae reach full growth during the third season, pupate, transform into adults and remain in the soil until following spring when they emerge.

Location:

The Peavine Burn plantation, Prospect R.D., Rogue River N.F., has been planted three successive years to attain full stocking. Maximum stocking has not been reached because of seedling mortality. Mortality resulting from insect damage can be reduced by using chemical control.

Objective:

In response to an appeal by the Forest, a pilot test should be made in the problem area to (1) test the effects of dieldrin or aldrin on soil-inhabiting insects in forest plantations, and (2) determine the extent of phytotoxicity the application rate will have on five species of coniferous planting stock.

Methods:

Five conifers will be planted for each treatment and two treatments will comprise one replication. Five species for use in this study will include Jeffrey pine, ponderosa pine, sugar pine, western white pine, and Douglas-fir. Chemical treatment will be at the application of five pounds of actual dieldrin or aldrin per acre. This material will be hand applied in granular form which is in line with development of granular insecticide applicator for tree planting machines (Project #1666) being developed by USFS Equipment Development and Test Program.

Trees will be hand planted, using a tree-planting auger. While the soil is being replaced after the seedling is positioned, the insecticide will be added. This chemical will be buried, minimizing surface environmental contamination. no broadcast?

The area selected for this study will be within the burn area where insect feeding was detected. Test site will measure 16 by 20 chains and 50 plots will be established. Twenty-three plots will be placed on each side of a north, south base line and four plots will fall along this line. Plot spacing will be four chains apart on an east, west line. Parallel lines will be spaced two chains apart. Ten trees will be planted within a one-hundredth acre plot and each plot will comprise one replication. Five trees will be planted in a row at five-foot intervals. Two parallel rows will be planted five feet apart and treatment designs will be as follows:

JP-T	PP-C	SP-T	WW-C	DF-T
JP-C	PP-T	SP-C	WW-T	DF-C

seems awfully high.

Insecticide application will be at the rate of 100 pounds of five percent granules per acre. This amounts to 1.05 grams per treated seedling or 0.6 pound of granules for 250 treatments. The small amount of insecticide will have to be added to sand or other dry materials for treatment bulk. Treatment packets can be prepared before field operations begin. The chief advantage for using granules is that treatments can be confined to small areas without contaminating adjacent controls. Hazards associated with spray or dust drift will be greatly reduced.

Post-treatment evaluation:

Plots will be evaluated for damage in July and October. The first examination will record number of dead or dying seedlings. The second examination will confirm mortality by inspecting the root system and rating mortality resulting from insect damage, natural causes, or phytotoxic chemical effects.

Manpower requirements:

	Man-days		
	Regional Office (Entomologist)	Ranger District	Supervisor's Office
Post-treatment planning	3	1	1
Plot layout	2	2	0
Treatment preparation	5	0	0
Field treatment	5	10	1
July inspection	2	2	1
October inspection	2	2	1
Data analysis	5	0	0
	24	17	4

Stanley W. Meso

cc: K. H. Wright ✓

SWMeso:mlw

AUG 29 1961

OREGON STATE UNIVERSITY CORVALLIS, OREGON

SCHOOL OF SCIENCE Reply: care of DEPARTMENT OF ENTOMOLOGY

August 26, 1961

Mr. Al Sorseth, Ranger
Oakridge Ranger District
Oakridge, Oregon

Dear Mr. Sorseth:

The white grubs responsible for the damage to your douglas fir seedlings are larvae of the lined June beetle, Polyphylla decemlineata. Many last stage larvae were present and also a few second stage larvae. Several of these second stage larvae had recently moulted and may represent larvae hatched from eggs laid early this summer.

My observations on the biology of this species at Corvallis indicate that several sizes of grubs overwinter indicating a life cycle of about three years. Pupation takes place in early June and I have obtained adults as early as July 4. Pupation is at shallow depths ranging from 5 to 6 inches. Adults feed on conifer foliage at night and continue in flight for several months. Occasional specimens are taken at lights but they do not seem strongly attracted. Infestations are usually confined to sandy or sandy loam soils, often along streams and in bottom land.

The best control measure we can suggest is to make an overall soil treatment with either aldrin or heptachlor, at 10 pounds actual material per acre, after you have lifted your plants, thoroughly mixed to a depth of 6 inches. Attempts to control the large grubs now present will likely prove futile. Time of application will not be important so long as you have the material in place before next July 1, ready to kill the new batch of small grubs.

Treatment at the rate given above should be effective for at least five years, perhaps longer. Rototilling, as you suggested for soil now free of trees, would kill most of the grubs now present but of course would have no residual effect. One caution in applying soil insecticides such as aldrin or heptachlor is to get them covered and mixed with soil soon after application to the soil surface. They can be applied either in liquid form or as a granular material.

You asked for suggestions as to experimental materials which might be tried for control of grubs now present, with the trees in place. Mr. Morrison suggests VC-13, a new organic phosphate of very low mammalian toxicity, which is showing great promise for symphilid control. It is used at the rate of two gallons of the emulsion concentrate per acre, applied through the sprinkler irrigation. I am shipping you a gallon of the material with our compliments. It should be put into the sprinkler system so that it goes out over a 30 minute period. If needed, we can furnish further details of this procedure.

This white grub is of such importance on many Oregon crops that research on its biology and control should be started. I am hopeful that we can at least interest a graduate student in taking it up for a thesis problem.

Sincerely yours,

Paul O. Ritcher

Paul O. Ritcher, Head
Department of Entomology

POR:sr